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09/543,951	04/06/2000	William S. Dalton	1633-015A	7898

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EXAMINER

MILLER, WILLIAM L

ART UNIT

PAPER NUMBER

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**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

Paper No. 23

Application Number: 09/543,951  
Filing Date: April 06, 2000  
Appellant(s): DALTON ET AL.

**MAILED**

JUL 29 2003

**GROUP 3600**

Bradley N. Ruben  
For Appellant

**EXAMINER'S ANSWER**

This is in response to the appeal brief filed 05/05/2003.

**(1) *Real Party in Interest***

A statement identifying the real party in interest is contained in the brief.

**(2) *Related Appeals and Interferences***

A statement identifying the related appeals and interferences which will directly affect or be directly affected by or have a bearing on the decision in the pending appeal is contained in the brief.

**(3) *Status of Claims***

The statement of the status of the claims contained in the brief is correct.

**(4) *Status of Amendments After Final***

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

**(5) *Summary of Invention***

The summary of invention contained in the brief is correct.

**(6) *Issues***

The appellant's statement of the issues in the brief is correct.

**(7) *Grouping of Claims***

Appellant's brief includes a statement that claims 1 and 6 do not stand or fall together and provides reasons as set forth in 37 CFR 1.192(c)(7) and (c)(8).

**(8) *Claims Appealed***

The copy of the appealed claims contained in the Appendix to the brief is correct.

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**(9) Prior Art of Record**

5,810,365	BRANDON ET AL.	9-1998
6,030,175	BAGEPALLI ET AL.	2-2000

**(10) Grounds of Rejection**

The following ground(s) of rejection are applicable to the appealed claims:

Claims 1-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brandon et al. (US#5810365) in view of Bagepalli et al. (US#6030175).

Regarding claim 1, Brandon discloses a retractable packing segment for an apparatus, the apparatus comprising: a rotating shaft 11 of a turbine disposed in a casing 12; a plurality of packing segments 13 disposed in a ring and centered on an axis defined by the shaft to provide a seal therearound; and the retractable packing segment comprising an inner face for sealing against the shaft and an outer face supporting a T-shaped extension 13a,13c, the inner and outer faces of the extension spanning opposing side ends which are cut parallel with radii of the axis.

Brandon fails to disclose at least one brush seal disposed on the inner face of the segment, and wherein the brush seal has opposing ends and at least one of the ends is cut non-parallel with radii of the axis. Bagepalli teaches the use of a brush seal in cooperation with a labyrinth seal in a hybrid segmented packing assembly 10 for the purpose of preventing and/or limiting gas-path leakage into or out of the gas path of a turbine (col. 1, lines 10-29; col. 2, lines 48-54). Specifically, Bagepalli discloses at least one brush seal 54 disposed on the inner face of the segment wherein the brush seal has opposing ends 70,72 cut non-parallel with radii of a shaft 76 defined axis. Therefore, as taught by Bagepalli, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the sealing apparatus of

Brandon by including at least one brush seal disposed on the inner face of the segment wherein the brush seal had opposing ends and at least one of the ends was cut non-parallel with radii of the axis. The inclusion of the brush seal further preventing and/or limiting gas-path leakage into or out of the gas path of the turbine and thus improving the seal.

Regarding claim 2, as discussed above Bagepalli teaches both ends of the brush seal are cut non-parallel with radii of the axis.

Regarding claims 3 and 5, Brandon discloses the inner face includes a plurality of fins 14 extending different distances therefrom.

Regarding claim 4, Bagepalli teaches a plurality of brush seals via a plurality of brush seal segments.

Regarding claim 6, Brandon discloses a retractable brush seal for an apparatus, the apparatus comprising: a rotating shaft 11 disposed in a casing 12; the brush seal in the geometry of a ring formed from a plurality of packing segments 13 and centered on an axis defined by the shaft to provide a seal therearound; and each segment comprising an inner face for sealing against the shaft and an outer face supporting a T-shaped extension 13a, 13c, the inner and outer faces of the extension spanning opposing side ends which are cut parallel with radii of the axis.

Brandon fails to disclose at least one brush seal disposed on the inner face of the segment wherein the brush seal has opposing side ends cut non-parallel with radii of the axis.

Consequently, Brandon also fails to disclose one of the side ends being cut angled to form a tongue extending past the segment side end and the other of the ends being cut at the same angle relative to the segment to provide a groove for accepting a tongue formed by a brush seal on an

adjacent packing segment. Bagepalli teaches the use of a brush seal in cooperation with a labyrinth seal in a hybrid segmented packing assembly 10 for the purpose of preventing and/or limiting gas-path leakage into or out of the gas path of a turbine (col. 1, lines 10-29; col. 2, lines 48-54). Specifically, Bagepalli discloses at least one brush seal 54 disposed on the inner face of the segment wherein the brush seal has opposing side ends 70,72 cut non-parallel with radii of the shaft 76 axis. Bagepalli also discloses one of the side ends is cut angled to form a tongue extending past the segment side end 60, and the other of the ends is cut at the same angle relative to the segment to provide a groove 46 for accepting a tongue formed by a brush seal on an adjacent packing segment. Therefore, as taught by Bagepalli, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the sealing apparatus of Brandon by including at least one brush seal disposed on the inner face of the segment wherein the brush seal had opposing side ends and at least one of the ends was cut non-parallel with radii of the axis, and wherein one of the side ends was cut angled to form a tongue extending past the segment side end and the other of the ends was cut at the same angle relative to the segment to provide a groove for accepting a tongue formed by a brush seal on an adjacent packing segment. The inclusion of the brush seal further preventing and/or limiting gas-path leakage into or out of the gas path of the turbine and thus improving the seal.

Regarding claims 7 and 9, Brandon discloses the inner face includes a plurality of fins 14 extending different distances therefrom.

Regarding claim 8, Bagepalli teaches a plurality of brush seals via a plurality of brush seal segments.

*Response to Arguments*

In view of the absence of arguments by the appellant pertaining exclusively to Brandon, and the appellant's statement "There is no disagreement that Brandon discloses a fin-type labyrinth retractable seal...The contention is whether Bagepalli can be properly combined with Brandon" (brief pages 3-4), the appellant admits Brandon discloses all of the limitations of claims 1 and 6 except for the packing segment including at least one brush seal as claimed in detail.

Although the appellant also admits "Bagepalli does teach a brush seal in a fin labyrinth having ends cut non-parallel with the radii of the shaft" (brief page 5, lines 11-12), the appellant argues Bagepalli cannot be properly combined with Brandon as "...Bagepalli provides such a teaching only in the context of a non-retractable seal. Brandon and the present invention are directed to retractable seals" (brief page 5, lines 12-14).

The examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, there is clear teaching, suggestion, and/or motivation to modify Brandon in view of Bagepalli as both the Brandon and Bagepalli disclose labyrinth turbine seal assemblies for the primary purpose of preventing and/or limiting gas-path leakage into or out of the gas path of the turbine, and the hybrid seal assembly taught by Bagepalli, specifically the incorporation of a brush seal in the labyrinth seal wherein the brush seal ends are cut non-parallel with the radii of

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the shaft, improves the preventing and/or limiting of gas-path leakage (col. 1, lines 10-29; col. 2, lines 48-54). Although the examiner acknowledges Brandon discloses specific structure for providing a retractable seal, namely springs 16, and Bagepalli fails to specifically disclose retractable seal structure, the Bagepalli seal will inherently experience some retraction via temperature changes within the turbine. In any event, Brandon discloses the retractable seal structure and therefore to meet the claim limitations the Bagepalli reference need only teach the incorporation of a brush seal into the labyrinth seal wherein the brush seal ends are cut non-parallel with the radii of the shaft.

The appellant argues that although "the Bagepalli structure could theoretically be used as a retractable seal" per the Sulda declaration (brief page 5, last two lines), the Sulda declaration also states the overlapping offset disclosed by Bagepalli (see joints 50 and 58 in Fig. 1) would restrict or hinder radial movement necessary for a retractable seal. Further, the appellant indicates per the Sulda declaration that the reality of a turbine, with differences in spring forces tending to open (retract) the seals, differing steam pressure around the seals, and different frictional forces between each of the multiple segments, prevents the Bagepalli structure from being used as a retractable seal. However, these arguments pertaining to the overlapping offset and turbine operating conditions are irrelevant as Bagepalli is being applied as a teaching reference solely for the incorporation of a brush seal in the labyrinth seal wherein the brush seal ends are cut non-parallel with the radii of the shaft. The Bagepalli reference need not specifically disclose a retractable seal structure to modify the Brandon reference as the Brandon reference already discloses the retractable seal structure.



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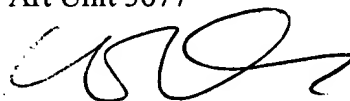
Regarding Bagepalli, the appellant argues the structure of the seal segment and the brush are designed to prevent injuries to workers handling the seal segments, and it is for this reason the offset and canted brush ends are present. The examiner agrees Bagepalli discloses the offset and canted brush ends prevent worker injuries, however Bagepalli also states the purpose of the seal is to further prevent and/or limit gas-path leakage into or out of the gas path of the turbine (col. 1, lines 10-29; col. 2, lines 48-54), and this purpose provides the rationale and motivation to combine Bagepalli with Brandon.

Regarding claim 6, the appellant argues Bagepalli fails to disclose one of the brush side ends forming the claimed tongue as no portion of the brush extends past the segment side end. The examiner disagrees as the brush seal end shown in Fig. 3 clearly extends past the segment side end 60 and thus is properly being viewed as the tongue.

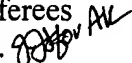

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

William L. Miller  
Primary Examiner  
Art Unit 3677



W.L.M.  
July 24, 2003

Conferees  
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